

RESEARCH COUNCIL OF ALBERTA

- An Historical Review -

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RESEARCH COUNCIL OF ALBERTA

- An Historical Review -

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### The Formative Years (1919 - 1933)

Since the end of World War I, the province of Alberta has played a significant and innovative role in the development of organized research in Canada. The Scientific and Industrial Research Council of Alberta (SIRCA), established in 1921, constituted the first permanent government sponsored scientific and industrial research organization in the nation. Major scientific and technical accomplishments were achieved by this organization and in 1930 it was enlarged and diversified in its aims and activities. Renamed the Research Council of Alberta, the council has bolstered its reputation for thorough, competent scientific investigations in subsequent years. The successful precedent established by Alberta in the field of scientific and industrial research has been emulated in several instances by other provincial governments and by the federal government.

The origins of SIRCA are to be found in the events and circumstances which prevailed in post-World War I Alberta. Increasing efforts were made at that time to stimulate economic growth based on the industrial exploitation of the provinces natural resources. It was realized that effective extraction and utilization of these resources required technological developments and devices which had thus far eluded individual industrial entrepreneurs. As well, the establishment of new industries in the province required more comprehensive information regarding the nature and location of mineral deposits than had hitherto been available. During the war, the solution to national requirements for information and technical inventions had been successfully sought in organized scientific and industrial research, at that time a relatively new phenomenon in Canada. Alberta businessmen and civic leaders, having witnessed the successes of the newly-formed federal Honorary Advisory Council for Scientific and Industrial Research in the discovery of solutions to technical problems, made representations to the provincial government in which they requested the establishment of a provincial research organization devoted to the economic development of Alberta resources.

The Liberal government of Charles Stewart was initially hesitant regarding the foundation of a public research agency. But in 1919

the premier sanctioned the formation of the Alberta Industrial Development Association (AIDA), an organization which comprised representatives of the university, business and the general public, and which was designed to advise the government as to measures which should be taken with regard to industrial research.

An active publicity campaign, launched by AIDA, was influential in promoting governmental and public support of the aims of organized scientific research. An advisory committee formed under the auspices of AIDA met with the Minister of Municipal Affairs and Health on three occasions during 1919 to discuss specific proposals for research. Vigorous arguments in favor of scientific research were presented by President Henry Marshall Tory of the University of Alberta. Tory had endeavored to establish effective applied research programs within the university since the inception of that institution in 1908. He and his academic colleagues, who supported him in his stand, gained a sympathetic ear in the government through Provincial Secretary J.L. Cote, who had expressed a great interest in the development of provincial mineral resources, especially oil sands, for a decade. Upon his assumption of the position of chairman of the AIDA advisory committee in October, 1919, Cote commissioned a preliminary survey of provincial resources by Professor John A. Allan of the University of Alberta. As well, Cote assigned President Tory to tour and report upon the progress of research programs elsewhere in Canada and the U.S.A.

Following his tour, Tory commented most favorable upon an arrangement under which the University of Ohio collaborated with the U.S. Bureau of Mines to conduct an efficient, economical industrial research program. The provincial government, impressed by the results of Professor Allan's survey and enamored of the prospects of further economic development based on scientific investigation, approved the expansion of the university research program along the lines recommended by Tory in his study of other institutions. The Industrial Research Department (IRD) was thus created at the university in February 1920. Government funds were advanced to hire two researchers, and to facilitate the expansion of industrial investigations. Under the guidance of Tory, an effective research program was inaugurated

by the IRD. Motivated by the encouraging progress of this university department and of the advisory committee led by Cote, the government was prompted, by late 1920, to take steps towards the formation of a publicly funded scientific research organization.

A joint effort between the university and the province was envisaged, and on January 6, 1921, an Order-in-Council was passed which provided for the establishment of the Scientific and Industrial Research Council of Alberta. The functions of this organization were to undertake scientific investigations of natural resources which would enhance the economic development of the province. A committee, comprising five members, was constituted to continue, on an expanded scale, the work begun by the AIDA advisory committee and by the IRD. Council members were to receive no financial remuneration for their services.

SIRCA was empowered to supervise and direct research work in the province and to contract agreements with the university regarding the use of facilities. An agreement was signed with the university Board of Governors on January 20, 1921, in which the respective responsibilities of the government and the university with regard to research were affirmed. According to the financial structure of SIRCA, estimates submitted by the council to the government were to be presented to the legislature for approval. Annual reports were to be tabled in the legislature. The government was represented on the council by Provincial Secretary Cote and Chief Mines Inspector John Stirling. University representatives were President Tory, and Professors J.A. Allan and N.C. Pitcher.

According to the aims and activities outlined in the Order-in-Council, SIRCA was left considerable latitude in its interpretation as to what projects would assume greatest priority in its efforts to promote economic development. However, it was restricted by the need to satisfy government and public as to the validity of its work. In the early 1920's, Albertans expressed the desire for pragmatic, applied research programs devoted to the solution of immediate, practical industrial problems. Major public concerns involved such issues as road construction and improvements. Better techniques of coal classification and analysis, as well as the discovery of marketable

by-products of coal, were requested by coal operators. Commercial development of the northern oil sands, clay resources and other yet undiscovered mineral deposits were also considered vital to provincial prosperity.

SIRCA responded effectively to the demands of Albertans for practical research. Under the guidance of Dr. Tory, and his successor as university president, Dr. R.C. Wallace, the council adopted a practical approach to research which stressed applied rather than pure investigations. However, SIRCA members endeavored to temper the demands of those Albertans who advocated the development of short-term lucrative economic enterprises at the expense of long-range conservative schemes of resource development. During the 1920's, a policy was evolved by the council which embodied principles of rational, methodical and cautious development; these basic concepts influenced the orientation of SIRCA programs and governed the evaluation by council members of the economic prospects of certain types of resource exploitation.

In the formulation and implementation of technical policy, SIRCA encountered little interference from governmental authorities. An element of uncertainty was precipitated temporarily in August, 1921, when it was not known what attitude would be adopted towards the council by the newly elected United Farmers of Alberta government. However, the new premier, Herbert Greenfield, was easily persuaded of the economic validity of the work of the council, and upon the resignation of J.L. Côté from the government in October, 1921, Greenfield assumed the role of SIRCA chairman. This act indicated Greenfield's conviction that scientific research constituted a significant government priority. Under the UFA administrations of both Greenfield and his successor, J.E. Brownlee, few attempts were made by political authorities to influence the technical policies of SIRCA. This tendency, coupled with the fact that the programs were based on the advice and knowledge of competent senior researchers, assured the preservation of an element of creativity and free exchange of ideas among the council researchers. Under the direction of a nucleus of widely respected scientists, the council moulded a tradition which stressed excellence, enthusiasm and quality of results, coupled with a potential for practical application of



scientific findings. Common bonds of technical experience and personal dedication to the advance of science were shared by university professors and researchers Tory, Wallace, Allan, Pitcher, Edgar Stansfield, Karl Clark and Robert Boyle. These men not only contributed their personal knowledge to SIRCA, but encouraged the development of research skills among junior staff at the council. Mutually beneficial Master of Science programs were worked out, whereby students based their theses on research done in the employment of the council. For administrative and technical purposes, divisions of roads, fuels and geological research were created. A fourth division, involving clays research, was postponed indefinitely because of the inability of Dr. Tory to find a man whom he considered suitable to head the division. A Timber Testing section was established as well in the early 1920's.

In attempts to increase the availability of resource information throughout the province, efforts were made to publish frequent reports of findings of researchers and to publicize widely the nature and value of the work of council.

Major technical and theoretical advances achieved in the initial decade of the council attested to the effectiveness of SIRCA's work. Under the direction of Karl Clark, SIRCA moved into the forefront of investigations pertaining to oil sands extraction and separation techniques. Important steps were also taken towards the perfection of a paving process based on the use of oil sands. Work began in the laboratory, then proceeded to the construction of a laboratory test plant, and finally to the erection of a pilot plant for the production of bitumen. By 1925, a semi-commercial plant at the Dunvegan Yards was processing ten tons of oil sand per day, heating and removing bitumen at a resonable cost.

By 1925, the Fuels Division had compiled and published typical coal analyses for specific mining areas. Knowledge had been gained regarding the heating value of coals then used in domestic heaters. The efficiency of various patented furnaces had been tested, and efforts were ongoing in the design and testing of apparatus required to measure the efficiency of domestic hot air furnaces.

The Geological Division made significant progress during the

1920's in the mapping of provincial resources, primarily in areas of extensive coal deposits. On the basis of this work, a classification of coal districts was completed which was used in regard to the Coal Sales Act, and by the Mines Branch in the compilation of statistics, and by the federal government. A highlight in the work of the Geological Division occurred in 1926 with the publication of a geological map of Alberta.

Throughout the 1920's SIRCA encountered opposition from individuals who continued to distrust what they viewed as a theoretical academic approach to economic resource development. On several occasions, accusations were made that the cautious long-term approach to resource development taken by council would retard the prosperity of the province. However, provincial governments continued to back SIRCA policies despite incidents of dissatisfaction with the council. This governmental support was due partly to the fact that praise of council work by industrialists and the general public outweighed criticism and partly to the increasing instances in which the council proved useful to the government.

An increasing volume of requests for technical aid and advice was received from existing and prospective industrialists throughout the 1920's. Letters of gratitude and praise for the satisfactory responses of the researchers to industrial problems attested to the value of the council's work. Credit accrued to SIRCA as a result of its ability to provide more efficient service to political authorities in the realm of technical advice than was then available through existing government departments. While initial relations between council members and the Department of Public Works were cool and rather strained, that government department began to co-operate more and more closely with the council during the decade after 1921 on issues such as road paving experiments; the results of this co-operation were mutually beneficial, in that paving techniques were advanced through practical experimentation.

Premiers and cabinet ministers obtained necessary counsel regarding technical and economic merits of proposed projects for resource developments from SIRCA; they were thus enabled to respond more competently to requests for advice and information or for permission to invest in certain forms of enterprise.

Efforts to expand the functions of SIRCA to accomodate growing requests for scientific aid resulted, in the later 1920's, in pressure towards the adjustment of the administrative framework and objectives of the council. The impetus towards the expansion of council duties was further strengthened after 1928 with the impending transfer from the Federal Government of the administration of Alberta's natural resources. Government officials were prompted at that time to appraise the potential benefits of a scientific organization capable of serving as an advisory council to the cabinet on matters of resource control. Already, in 1928, as a result of increased funds obtained through the Natural Resource Research Act, the scope of activities of the council had been broadened. Soil surveys, as well as a program of natural gas research were implimented. Events of 1929 witnessed a further enlargment of council's program as a consequence of the commencement of a cooperative research program between SIRCA and the National Research Cancil (NRC). It was intended, through joint investigations of natural gas, coal and oil sands, to enhance scientific progress in those fields and to avoid the pitfalls of overlap and duplication of research caused by insufficient communication between research organizations.

Initial structural transformations designed to handle a more comprehensive technical program occurred in November 1929 with formation of the Technical Advisory Committee (TAC) to make recommendations concerning technical objectives and priorities. Major administrative changes were made in March, 1930, when the government finally passed An Act to Establish a Research Council in Alberta. Under the terms of the act, council was enlarged to include up to ten members, of which at least two were to be representatives of the Executive Council and one, the Director of Research, was to be the President of the University of Alberta. It was hoped by council members that under the new composition of council; a problem could be avoided which had occurred in the 1920's; in each case in which a premier had assumed the chairmanship of the council, insufficient time on the part of the premier had been available to devote to council matters. As in 1921, no remuneration was to be granted to council members.

The Research Council was given complete responsibility for all matters of scientific and technical research assigned to it by the cabinet.

It was also to serve as an advisory body to the cabinet on scientific matters affecting industrial expansion or resource utilization. Its duties involved, as well, investigations conducted at the request of specific industrial firms and projects undertaken to enhance the welfare and progress of Albertans in general. To increase the powers of council with respect to such matters as patents and the acquisition of property and goods, the government constituted the new council as a corporate body. The Research Council was authorized to make by-laws for the conduct of its business and to appoint staff and prescribe their duties. Throughout the process of administrative modification, efforts were made to preserve an element of continuity with the policies and methods of investigation which had been pursued successfully by SIRCA during the previous decade.

Little opportunity was afforded, however, following the re-organization of the Research Council to implement the policies of research expansion outlined in the Research Council Act of 1930. The exigencies of the severe depression which engulfed Alberta and Canada during the 1930's provoked, firstly, the curtailment of government funds to the council, and ultimately, the entire withdrawal of the separate legislative vote of funds, in 1933.

During the brief period between the extension, and subsequent sharp cutbacks, in the activities of the Research Council, further advances were achieved in various realms of industrial research. The policies adopted by the Research Council with regard to economic development approximated those which had characterized SIRCA. The resurrection of a semi-commercial oil sands separation plant near the oil sands quarry in the Fort McMurray-Waterways region was effected in 1930. Arrangements were made later in that year for the takeover of the plant, which was capable of processing three tons per day of oil sands, by private entrepreneur Max Ball, who planned to employ a separation process which incorporated features of the separation techniques developed by Karl Clark. Co-operation with the Dominion Mines Department and with the Provincial Mines Bureau was continued in the field of coal research during this period. Soil surveys were undertaken at the behest of the provincial government, while preliminary studies were conducted in the field of rural electrification.

The Dark Years (1933 - 1942)

With the severance of separate funds to the Research Council in 1933, the future of scientific and industrial research in the province was gravely imperilled. Although further work was officially to be held in abeyance only until funds could be made available, the break in the continuity of research programs, as well as the loss, through lay-offs, of valuable researchers, constituted a distinct setback to the progress of such long-term research projects as were currently underway in the areas of oil sands and coal classification. That a semblance of continuity and viability was maintained in the development of the Research Council throughout the depression was attributable to the decision of the authorities of the University of Alberta to shelter the organization within its financial and administrative framework. A nucleus of senior researchers was retained by the university; their research activities were restricted, however, by their obligations to fulfill teaching duties in addition to their experimental work. Support was also granted by the university for the continuation of several projects. Thus, a skeletal framework was maintained, and with the aid of National Research Council grants, effective work was accomplished, though on a greatly reduced scale, in the areas of coal research, natural gas investigations and road materials experimentation.

Renaissance (1942 - 1962)

At the first signs of economic rejuvenation in the province, a campaign was launched within the university to secure the revival of the Research Council. Especially active in their efforts to stimulate renewed governmental support for research were the members of the Science Association, who, in addition to their attempts to instill among Albertans an interest in, and respect for, scientific research, undertook in the late 1930's and early 1940's to lobby the government on behalf of the Research Council. A major impetus for the revival of the council came from researchers such as Karl Clark who, since 1937, had vigorously promoted the expansion of provincial oil sands research. By 1942, Clark's arguments concerning the necessity of oil sands research were reinforced by the renewed interest displayed in the commercial development of the Athabasca oil sands by private investors and by the governments of Canada and the U.S.A., whose wartime policies encouraged the exploitation of mineral and fuel resources.

Clark's colleagues, especially Edgar Stansfield and E.H. Boomer, joined him in efforts to secure the revival of the Research Council. Strong support for the campaign to procure funds for the Research Council came from the University of Alberta President, Dr. Robert Newton, in the early 1940's. A University of Alberta survey committee was commissioned to familiarize the government with the aims and objectives which had prevailed under the Research Council prior to 1933. Enthusiasm for the expansion of scientific and industrial research was rekindled in the political sector, and arrangements were made for a renewal of the agreement which had previously governed the activities of the Research Council.

Through an Order-in-Council, no. 1613/42, passed on November 4, 1942, the Research Council was reconstituted according to the terms of the Research Council Act of 1930. The Honorable Nathan E. Tanner was appointed chairman of a six member council. Other members included Premier William Aberhart, Minister of Public Works W.A. Fallow, President Robert Newton of the University of Alberta, businessmen L.E. Drummond of Edmonton and J.E. Davies of Medicine Hat, and Edgar Stansfield, secretary. A nine member Technical Advisory Committee was also created. Eight permanent staff members were hired as researchers; except for the compiler, all were chemists by training.

The financial affairs of the Research Council were to be handled through the Office of the Bursar at the University of Alberta because this arrangement had functioned satisfactorily in the pre-1933 period. Estimates were to be considered by the full council but were to be referred to the Technical Advisory Committee for study and recommendations. With regard to the preparation of estimates, the suggestion was made that the Research Council should be less specific in the details of estimates submitted to the government. In such a manner, it was hoped to preserve more freedom to adjust expenditures in accordance with changing conditions.

Efforts to modify the administrative framework of the restored Research Council culminated in March 1943 with the passage of a legislative amendment to the Research Council Act of 1933. Henceforth, two representatives of the Executive Council were obliged to serve on the Research Council. Ordinary terms of office for councillors were extended from one to two years, or to such time as successors were appointed. (In most instances, councillors after 1943 were to serve for greater periods than two years.) Provision was also made for the appointment of an Acting Director of Research. Dean R.S.L. Wilson of the Faculty of Applied Science at the University of Alberta was chosen to fill this position. Finally, the Research Council was empowered to obtain from pertinent sources information and statistics which were considered vital to the performance of its duties.

Further structural transformations to the Research Council occurred with the transfer of responsibility for the Gasoline Testing Laboratory to the council on April 1, 1943. Existing staff members of the laboratory were maintained by the Research Council and previous functions of the laboratory continued to be fulfilled. Over ninety percent of the workload of this laboratory involved the testing of aviation gasoline for the Department of National Defence for Air. Tests were also undertaken for the Provincial Secretary, the Provincial Analyst, Canol and some oil companies.

Several significant problems hampered the progress of the Research Council for the duration of the war. A shortage of trained personnel curtailed the conduct of comprehensive research programs in crucial areas, such as fuels. Difficulties and delays were also experienced with regard to the acquisition of vital equipment and supplies.

Key administrative issues affecting the rejuvenated Research Council during the war years concerned the relation of the council to the University of Alberta and to the government. Also significant was the matter of revenues earned through research work carried out for fees. Discussions between the council secretary and the Provincial Treasurer Walter Huckvale led to the suggestion that steps be taken to accept and to regularize peculiarities of the Research Council structure, such as its geographical separation from the rest of the government administration apparatus and the similarity of its work to university research. On the recommendation of Huckvale, Orders-in-Council were drafted to insure that council would use university facilities and place orders through the university, but would make payment, following regular governmental procedures, through the auditor's department.

The question of the disposition of monies earned by the council was eventually resolved in 1945 through a modification of the Research Council Act of 1930. According to an amendment of the Act, passed on March 20, 1945, the council was permitted to retain assets acquired through research provided that, should the council accumulate an extensive cashsurplus not required for its own purposes, the Exccutive Council could order the payment of part or all of that surplus into the General Revenue Fund. A special account, separate from monies appropriated by the legislature for research work, was created to handle the funds earned through paid research.

The dominant theme of wartime research centred, as in earlier years, upon fuels. A key role was played by the Research Council in the orientation of wartime oil sands research. In early 1943, an agreement was negotiated between the Research Council and Abasand Oils Limited, a private company operating in Fort McMurray. It was arranged that Karl Clark would act as a technical consultant to the company. Upon the federal takeover of Abasand Oils Limited, the Research Council-Abasand collaboration was terminated in May, 1943. In response to their exclusion from the federal research project, Research Council members urged the intensification of provincial oil sands research. In December 1943, the provincial government heeded the advice of the Research Council; plans were formulated for an immediate acceleration of oil sands research.

Further involvement of the Research Council and of the government in oil sands investigations was instigated through Order-in-Council



no. 1885/44, passed on December 6, 1944. Arrangements were made for co-operation between the provincial government and Oil Sands Limited, a private company, in which the Research Council was to assist in the erection and operation of a pilot plant at Bitumont. The separation techniques to be employed at Bitumont were to be based on the hot water process developed by Karl Clark.

A prominent activity of the Fuels and Geological Divisions of the revived Research Council concerned the compilation and publication of reports and findings regarding natural resources in the province. Under the direction of Professor John Allan, a 196-page summary was prepared by the geological section of work undertaken in that field prior to the revival of the council. By October 1943, a report entitled "Coals of Alberta" was completed by the Fuels Division.

Efforts toward the accumulation of existing information incurred delays in the initiation and expansion of innovative surveys and experiments. Laboratory work undertaken by the Fuels Section during the war involved primarily routine analyses of coal, although some analysis and briquetting work was conducted for the Emergency Coal Production Board. Work was also done for the Dominion War Metals Advisory Commission which entailed the testing of coal ash for vanadium content and the study of oil viscosity.

Rural electrification studies, initially conducted in 1930, were recommenced at the behest of the Executive Council in early 1943. Professor Andrew Stewart completed a report on this subject which he submitted to the government in August 1943. In 1944, experiments were made pertaining to the production of glass from silica sands, and briefs were prepared on the subject of research and resources for the Post-War Reconstruction Commission. A program of soil research was formulated by the Research Council in connection with provincial government plans for reconstruction. The council was to commence soil surveys in areas in which settlement of armed forces veterans was anticipated in the post-war era.

By 1945, council was confronted with increasing requests to test and evaluate industrial techniques and proposals for development. To fulfill the demand for information and advice, council created the post of Industrial Engineer. J.W. Oberholtzer was hired on November 9, 1945, to serve as Industrial Engineer under the direct supervision of a council committee. In subsequent years, the work of the Industrial Engineering Section of the Research Council was to prove of increasing importance and utility in provincial resource

development.

Several administrative transformations were effected by the Research Council in 1945. Approval was granted for the readjustment of staff classifications to conform to the policy which regulated other government departments. The creation of a small executive Technical Advisory Committee was also sanctioned on the basis that the existing TAC had become too large and unwieldy for ready summons and efficient discussion and decision-making.

Following the war, fuels, geological, natural gas and industrial engineering projects begun previously were continued, although the fuels research program tended to assume an increasingly analytical orientation. A number of innovative projects were implemented, such as highways research, basic studies relating to the utilization of straw and poplar, and investigations into the effects of ultra-violet light upon animal cycles. The Gasoline Testing Laboratory, which in 1946 became the Gasoline and Oil Testing Laboratory, broadened its work to include analyses of all petroleum products, except grease. Oil sands research continued to focus upon operations of the pilot plant of Oil Sands Limited at Fort McMurray. Upon the successful conclusion of the separation plant project in 1950, Research Council staff contributed significantly to preparations for a major promotional and informative Oil Sands Conference, held in Edmonton, September 10-15, 1951.

Due to the expansion of Research Council activities in the post-war period, space shortages became apparent and makeshift facilities were appropriated for the use of council on the university campus. Arrangements were made for the use of an army hut in 1947 and in the following year, council was obliged to secure the quarters of the renovated No. 1 Power Plant for coal briquetting experiments. Personnel problems also plagued the council, since although most wartime vacancies were filled by 1947, shortages of trained experts persisted in a number of fields.

Growth in the organizational complexity and technical functions of council, coupled with the concomitant expansion of the University of Alberta, led to the realization by the late 1940's that it was no longer possible for a university president to devote sufficient time to the job of Director of Research, in addition to his academic

responsibilities. Proposals for the appointment of a full-time Research Director led to an amendment in the Research Council Act in 1950 by which the provincial Executive Council could appoint a Director of Research. This director was to be a member of the council and was to be remunerated according to a salary fixed by the cabinet. For a brief period in 1950, Dr. Newton, following his retirement as University of Alberta president, served as part-time director, according to Order-in-Council no. 1162/50. The first full-time Director of Research, Dr. Nathaniel Grace, was chosen to succeed Dr. Newton on Oct. 22, 1951.

Under the directorship of Dr. Grace, the Research Council embarked on an era of steady expansion and progress. Over the period 1951-1956, the staff of the Research Council increased fivefold to 130 employees. New programs were inaugurated to promote efficient utilization of provincial natural resources, while existing projects were extended in scope. The work of the council was broadly subdivided into two classifications: projects of a long-term nature, and those which were undertaken solely to solve specific problems of a more immediate character.

A major change was effected in the technical structure at the outset of the 1950's which facilitated more detailed and specialized consideration of programs within various fields of research. Separate subject-area advisory committees were created in 1950 to support the Technical Advisory Committee. The initial committees dealt with the fields of oil sands, coal, gasoline and oil testing, geology, highways research, industrial projects, natural gas, soil surveys, and minor projects.

The subject-area advisory committees were alternatively initiated, altered or phased out in accordance with the demands of different sectors of government and industry. In 1951, the Advisory Committee for Highways Research was modified to accomodate changing problems and techniques in the field of road construction and maintenance. The following year witnessed the commencement of two new agricultural projects by a Research Council-ministerial committee. In 1953, the council established a clay laboratory to facilitate basic and applied clays research. As well, an Agricultural Co-ordinating Committee on Soil Classification, Surveys and Research was created in that year.

At the request of the Executive Council, a Fluoridation Committee was formed in 1953 to conduct an impartial investigation into the advantages of large scale public water fluoridation programs. Upon the completion of its report in 1954, this committee was disbanded. An Industrial Pollution Committee, formed in 1954 in response to requests by B.A. Oil Company, was continued into the next year as a clearing house for information and advice pertaining to specific pollution problems.

Fuels research continued to command significant attention from the council. Efforts were made during the early 1950's to modify experimental programs in accordance with shifting scientific and industrial trends. Of special significance was the rapid industrialization experienced by Alberta during this period. Much consideration was paid to the respective merits of basic and applied research as means to solving current resource related economic problems. In view of rapidly diminishing coal markets, for which there was apparently no immediate solution, a reorientation of the Research Council fuels program was implemented in 1953 and accomplished by 1955. Emphasis was placed upon the development of a wide, well co-ordinated program of research, based on projects of long-range character. Routine analyses and testing operations were continued, but the fuels staff was reinforced by highly-trained employees whose duties included the fundamental studies of coal composition and of alternative uses of coal.

A more basic approach was also adopted in the field of oil sands research. Further financial aid for basic research was received by the Research Council from the NRC which, in 1954, offered a \$10,000 grant to the provincial body to facilitate the conduct of pure scientific investigations.

At the same time that efforts were made to expand its involvement in research of a fundamental nature, the Research Council remained conscious of its commitments to aid in the solution of immediate problems encountered by industry. Closer contacts with industrial concerns were facilitated by the transfer of responsibility for NRC Technical Information Service for Alberta to the Research Council on April 1, 1953. The federal government undertook to pay the Research Council \$10,000 annually to assume responsibility for the dissemination

of industrial information and advice, a service formerly provided in Alberta by NRC. Through the operation of the Technical Information Service (TIS), the council attempted to cultivate more harmonious relations with industrialists and to acquire a clearer understanding of the technical problems and concerns which plagued industry in the province.

The Research Council endeavored in the early 1950's to respond effectively to heightened interest in Alberta in geological phenomena and problems. A strengthened geological program was advocated by the advisory committees and, although the expansion of the existing geological program awaited the completion of improved laboratory facilities, a decision was made in 1954 to begin extensive ground-water research.

During the period 1951-1956, council activities were restricted by an increasingly acute shortage of space and trained researchers. The problem of insufficient skilled personnel was attributed largely to the council policy of hiring staff at the bachelor level. The technical productivity of the Research Council suffered because of the tendency of researchers, upon having completed their M.Sc. requirements (frequently under the aegis of the council), to seek regular employment elsewhere.

A major obstacle to the attraction of new staff stemmed from the inability of the Research Council in the post-World War II era to pay competitive salaries in comparison with those offered by the growing number of research institutions elsewhere in Canada and the U.S.A. It was affirmed, for instance, in 1952, that from a financial perspective, it was more profitable for an individual to accept a position on a university teaching staff than to engage with the Research Council. In efforts to redress staffing problems, an upward revision of salaries was effected after 1953, and an active recruitment campaign was initiated by the province to attract researchers to the Research Council.

Of key concern to the Research Council throughout the early 1950's was the vital need for new, modern experimental facilities. Before his retirement as council director, in 1950, Dr. Newton had stressed the positive psychological effect which would obtain if council possessed its own building. Once physically separate from other university departments, it was maintained, the council would

assume a stronger identity and sense of worth in the public eye. Under the directorship of Dr. Grace, serious efforts were commenced by council to obtain government approval for the funding of a new building. Of favorable significance to council's campaign to acquire new facilities was the avid support of Dr. J.L. Robinson, an Executive Council representative who endorsed the concept of new facilities and who suggested in 1951 that efforts be made to secure financial support from industrial firms for the erection of a well-equipped Research Council building.

A committee comprising Dr. Grace, Dr. Stewart and J.E. Oberholtzer was constituted in November 1952 to compile a report on the requirements of the Research Council. They presented a brief entitled the "Special Needs of the Research Council of Alberta" to the government in early 1953. In this submission, they stressed that research facilities in the province were inadequate to fulfill contemporary opportunities and needs for scientific investigation; as well, they outlined a detailed proposal for the construction of new facilities. It was stated that a new building would permit the consolidation of research efforts in such a way as to enhance the administrative and technical integration of projects and to ensure more specialized laboratory work. The effect of a new building would also be apparent, it was suggested, in improved staff morale and in enhanced opportunities for fruitful intellectual contact between researchers who specialized in different fields.

Another argument in favor of a new building stemmed from the fact that new facilities were required if the council was to engage in a profitable joint research program with federal authorities. The Federal Mines Branch, the NRC, and several industrial firms had all expressed interest in collaboration with the Research Council on a number of projects. The chief barrier to the initiation of a co-operative research program had thus far centred upon the inadequacy of existing Research Council facilities.

Plans for the erection of a new building were approved by the government in 1953. Construction was commenced in 1954, and in 1955, the Research Council was able to conduct its eightieth meeting in its new quarters. On the basis of improved facilities and equipment,

council was able to embark upon expanded technical programs. A scheme was formulated in 1955 for the affiliation of the Research Council with a proposed University of Alberta School of Post-graduate Highway Engineering. In 1956, two new advisory committees were formed, one dealing with agricultural matters, the other with hail research. 1957 witnessed the expansion of cloud physics studies, conducted in co-operation with the Meteorological Division of the Department of Transport, and the reorganization of the Research Council natural gas research programs.

The Geological Division was successfully reorganized and strengthened in 1956 to fulfill increased requests for information and advice. Two new industrial engineers were hired to conduct more comprehensive and diversified investigations required or desired by industrial firms. Commendation for the work accomplished by the Research Council Industrial Engineering Section was received from the federal authorities in 1958. The structure and aims of this department served as a model in the establishment of similar divisions by other Canadian research institutions.

An innovative industrial project was commenced by the Research Council in 1958. A productivity conference was arranged to further communication with industrial entrepreneurs and to assist in the provision of technical information and advice. The success of this initial convention prompted the organization of subsequent productivity seminars. In 1959, an energy resources study group was formed among the senior staff of the council; its purpose was to heighten the awareness among Albertans of developing patterns of energy utilization in the province.

On several occasions in the late 1950's, the issue of the hiring of an economist was raised. A suggestion was entertained that an economist be employed to assist in the establishment of council's research priorities. It was decided, however, that the services of a professional economist were not warranted at that time. The majority of councillors expressed the view that difficulties such as would be encountered in selecting a suitably qualified man for the position of economic consultant mitigated against the proposal. The notion was reiterated that the Research Council should confine its activities to the discovery of technical information; evaluation of industrial projects from

financial and commercial perspectives was to be left to experts in other fields.

By 1958, a favorable rate of staff turnover was finally achieved by the Research Council; in fact, in that year, council was besieged with applications for summer employment. Approval was granted by the council in 1958 for the institution of Post-doctoral Fellowships as a means of attracting capable graduate researchers.

In the field of technical programs, 1959 witnessed the establishment of a Microbiological Section of council. Aided by financial grants from industrial firms, the council commenced a series of basic and applied microbiological investigations of coal and petroleum. A scheme which sought to improve co-ordination among various facets of the program for petroleum research was also implemented by the Research Council in 1958. Efforts were made to link more closely the engineering, geological, geochemical, chemical, mathematical and microbiological aspects of petroleum projects in order to facilitate more efficient studies of the problems of petroleum production, transportation and processing.

Within a year of the petroleum project readjustments, the entire technical organization of the Research Council was restructured to accomodate the formation of the Earth Sciences and Fuels Branches. Topics related to energy and fossil fuels were placed under the jurisdiction of the Fuels Division, while responsibility for geological and soil investigations was assigned to the Earth Sciences Branch. The consolidation of these areas of research led to improvements in the administration and co-ordination of projects, and aided council in the establishment of effective project priorities in the face of rapidly changing conditions of resource development.

With the advent of the 1960's, the Research Council reached a threshold from which it could look back upon a decade of steady expansion and diversification of research activities and forward to an era in which innovative projects of growing complexity were to be initiated. Detailed studies of transportation, especially with reference to pipelines, were implemented in 1960. The high quality of results achieved in the pipeline investigations bolstered the favorable reputation of the Research Council among many interested industrialists



in Alberta.

In the Fuels Branch, advances in the work of the Petroleum Division were aided in 1960 through the use of computer facilities. A new subdivision of Microbiology was incorporated into the Fuels Branch of the Research Council in 1960; in the following year, this subdivision was expanded and renamed the Special Projects and Microbiology Division.

In the Earth Sciences Branch, geological studies of known gypsum deposits and of two major iron deposits were completed by 1960. Problems were experienced in dealing with the voluminous requests addressed to the Groundwater Division of the council. Due to limitations upon the availability of experienced staff to conduct the desired studies, council was obliged to establish strict priorities with respect to the conduct of groundwater research.

At the outset of the 1960's, salary schedules at the council threatened to fall below the national average for trained researchers, as they had a decade earlier. Council director Dr. Grace emphasized the vital need for the council to provide adequate remuneration for research in order to retain the high standards of technical performance which had come to be associated with the council since its inception in 1921.

The question of by-law revisions arose at the commencement of the 1960's. It was suggested that modifications to the existing by-laws were necessitated by the occurrence of recent changes in the economic climate of Alberta and in the administrative structure of the Research Council. Consideration of the by-laws issue, initially slated for discussion in late 1961 was postponed, however, due to the sudden death on November 13, 1961 of council director Dr. Grace. A committee was created to supervise the selection of a new director, and on July 1, 1962, Dr. E.J. Wiggins was appointed to the post of Director of the Research Council.

Modern Period (1962 - 1977)

The fundamental aims and objectives of the Research Council after 1962 remained essentially the same as those which had prevailed under the SIRCA of 1921. The council continued its endeavors to stimulate economic growth in Alberta through scientific and industrial research. Transformations were effected in the realms of administrative structures and technical programs in response to changes which occurred in the economic and industrial climate of the province during the 1960's. Approval was granted to the recommendation by the director that a position of administrative assistant be created to relieve the director of some of the responsibilities currently associated with that position. Mr. Douglas Irwin, who commenced his duties as the first administrative assistant in early 1963, was responsible for handling a major part of the routine administrative operations of the council. He was assigned to the general supervision of stores, the machine shop, maintenance staff, and personnel files. Council also authorized the appointment in 1962 of an assistant director to serve as an alternate in the absence of the director. In accordance with the proposal that a senior researcher should assume the responsibilities of this job in addition to his regular duties, Dr. C.P. Gravenor was appointed assistant director.

1964 witnessed the severance of the final administrative bonds between the Research Council and the University of Alberta. In that year, the council officially assumed charge of its own purchasing functions. The council and the university continued, however, to maintain close contact and co-operation.

In the sphere of financial affairs, the Research Council was confronted in the early 1960's by the proposal of the provincial government to establish a fixed sum for research expenditures. In 1962, it was recommended that one million dollars per year be allotted to sustain the activities of the council. Members of the Executive Council expressed the desire that financial outlays for the commencement of new research projects be counterbalanced by the termination of existing programs. In such a way, council could

"hold the line" with respect to growth of research expenses.

In efforts to dissuade the government from its financial stance, non-government Research Council representatives argued that, while efforts were consistently made to adhere to the policies outlined by the Executive Council, instances occurred frequently in which it was not considered advisable to arbitrarily terminate an ongoing project in order to acquire the necessary funds to initiate a new investigation. Dr. Wiggins emphasized that a financially static research program was not viable since, aside from its need to offset inflationary monetary trends, a research organization was obliged, in order to enhance its effectiveness, to allow for growth potential in its program development. Although it was conceded that the council could seek funds from the industrial sector to supplement the legislative vote, it was suggested that undue dependence upon the acquisition of commercial revenue from industrial sources would produce undesirable side effects. Council members agreed that the council should strive to enlighten political authorities as to areas of scientific research which would prove advantageous to the economy and welfare of the province; in such a way, encouragement would be given to the efficient application of government aid to the actual research needs of Alberta.

The Research Council encountered criticism during the early 1960's on the basis of its involvement in such activities as the routine testing of municipal water supplies. It was contended by representatives of such groups as the Association of Professional Engineers that the council was encroaching upon the occupational preserve of private consultants in a number of instances. To overcome these grievances, a mutually beneficial decision was reached whereby the council withdrew from many of its former testing and analysis functions. Private firms were thus given the opportunity to secure consulting contracts in these areas, while council researchers were enabled to devote more time and energy to the conduct of innovative experimental programs.

Projects undertaken by the Research Council during the early 1960's were classified into four broad groups on the basis of their objectives. Approximately one quarter of the total research effort

was dedicated to the mapping and classification of natural resources by the Geological, Soils, Groundwater, and to a lesser extent, the Coal Divisions of the council. Major subjects of investigation concerned the availability of water supplies, the identification and classification of soils for agricultural purposes, and the discovery and analysis of mineral deposits.

Joint investigations conducted with other research agencies to solve problems of general public interest accounted for approximately one tenth of the research efforts of the council. Key studies in this area concerned highways engineering, which was carried out in cooperation with the provincial Department of Agriculture and the University of Alberta, and hail investigations, which were conducted in conjunction with the NRC, the Meteorological Division of the federal Department of Transport and McGill University. Little attention was paid by the council to agriculture and forestry as fields of research since existing federal and provincial agencies were able to accomodate investigations in those areas. Increasing attention was devoted, however, to such subjects as pulp and paper production, food processing, and the utilization of agricultural by-products.

Almost one half of the activities of the Research Council staff in the early 1960's was consumed in long-range studies intended to enhance the understanding of the nature and extent of provincial resources, and to aid in the discovery of new and improved processes of resource utilization. The views which the first research director, Dr. Tory, had expressed in the early 1920's were echoed four decades later in the statements by Dr. Wiggins that the Research Council should attempt to preserve and augment the long range economic interests of Alberta, even where the long-term research requirements of the province did not conform to the short-range concerns of individual industrial entrepreneurs.

The final main classification of research work undertaken by the council in the 1960's pertained to projects designed to solve immediate industrial problems. Efforts were made on a scale hitherto unprecedented in Alberta to assist industrial development through the discovery of new products and techniques of resource utilization. Explanations for the expansion in council involvement in the field

of applied industrial research lay partly in the fact that a number of investigations had reached the point at which commercial application of scientific techniques and theories appeared feasible. Also instrumental in the multiplication of industrial projects was the impact of increasing industrialization in the province; a growing volume of requests for technical advice and assistance was generated, as the number of primary and secondary manufacturing enterprises in the province mushroomed during this period.

In response to the growth in demand for industrial research, the council initially expanded the scope of activities of the existing Industrial and Engineering Services Division. Then, during the period 1963-1964, an innovative program entitled Product Research and Development (PRD) was instituted. The PRD Division of the Fuels Branch of council assumed responsibility for the conduct of research work sponsored by individual industrial firms. In addition, it undertook to investigate procedures and problems which were of vital concern to other divisions within the council, and to initiate programs intended to yield new industrial products.

The Research Council established an immediately favorable reputation among provincial industrial circles as an effective agency for the execution of specific industrial investigations on a contractual basis; the number of requests for the services of the PRD Division grew significantly in the period after 1963.

The extent to which the council could afford to undertake PRD projects was increasingly restricted, however, by a growing space shortage experienced in the 1960's. To remedy this problem, plans were initiated for the construction of a new pilot plant in the Clover Bar area of Edmonton. Completed in 1966, this facility greatly supplemented the capacity of the council to conduct research requested by industrial firms.

The first major project undertaken in the new pilot plant was the development of a hydrometallurgical process for the production of iron powder from the Peace River iron ores. This work was funded jointly by the Research Council and the Peace River Mining & Smelting Company.

The later 1960's were characterized by the consolidation and expansion of projects commenced earlier, and by the initiation of new studies, particularly in the field of PRD. Financial negotiations were commenced in 1966 between the Research Council, a group of private companies and the federal Department of Industry to accomplish technical and economic studies related to the transportation of solid commodities by pipeline. This project was officially launched in the following year.

The Alberta Co-operative Highway Research Program was expanded in 1966 to facilitate the extension of comprehensive studies regarding river hydraulics, and pavement design and performance. A Petroleum Recovery Research Institute, opened in 1966, initiated research projects intended to improve the techniques of oil and natural gas recovery employed in the province. Financed jointly by the provincial government and the petroleum industry, this organization was administered by the Research Council.

The role of the Research Council as the principal instrument of provincial government research was somewhat altered in 1968 upon the creation of the Human Resources Research Council (HRRC). The two government funded research bodies, remained distinct, although it was intended that links would be forged between them on the basis of their common concern with issues such as the nature and impact of technological change in the province. To the extent that the HRRC and the Research Council frequently approached similar topics from different perspectives, these bodies tended to pursue complementary rather than interdependent, or conflicting, paths of investigation.

An illustration of the validity of the long-range work of the council in the field of oil sands research occurred in 1967 with the inauguration of industrial operations by the Great Canadian Oil Sands Ltd. plant (GCOS) in the Athabasca oil sands. Years of dedication and hard work on the part of council members, especially Karl Clark, were rewarded by the decision of the GCOS company to utilize, on a commercial basis, the hot water separation process evolved by Clark with the aid of council researchers.

Fuel studies continued, in the late 1960's, to emphasize research

related to capsule pipelines, natural gas recovery, and strippable coal operations. In 1969, the divisions of Petroleum and Natural Gas were combined, pending the clarification of the future orientation of fuels investigations and the selection of a satisfactory replacement for Dr. G.W. Hodgson who was resigning as head of the Petroleum Division. As well, the integration of the two divisions was designed to foster closer co-ordination between the activities of the Petroleum and Natural Gas Divisions.

Steady expansion was experienced in the work of the Geological and Groundwater Divisions of the Earth Sciences Branch of the Research Council throughout the 1960's, largely in response to increased public and industrial demand for information and technical assistance. Soil studies were continued on a co-operative basis with the federal Department of Agriculture. By 1969, the preliminary soil survey of major agricultural areas was accomplished. Future field work was to entail the mapping and classification of marginal agricultural and forested localities.

Significant progress was achieved in the field of hail studies by 1969 and experimental cloud seeding operations were commenced by the council in that year. Programs of technical aid to industry grew steadily in importance throughout the latter 1960's. Not only did council's operations in the field of contract research increase in scope, but the nature of problems undertaken became more sophisticated. It was suggested in 1969 that the PRD Division should endeavor to cultivate specialized expertise in a few specific fields, such as oil sands and gas processing.

The growth of council activities was facilitated by the completion of an addition to the main council building in 1968-69. Difficulties in obtaining qualified candidates for senior specialized research positions continued however to plague the council during the late 1960's. In efforts to alleviate this problem, the council adopted a position in which a certain degree of flexibility was maintained with respect to the designation of research positions. Opportunities were thereby created to offer jobs to candidates whose knowledge and expertise in a particular field were greatly sought by the council. Problems

stemming from rapid turnover of professional and senior staff occurred much less frequently during this period than a decade earlier. This was attributable both to the maintenance of competitive salaries for researchers after 1963 and to the cultivation of an invigorating, attractive environment for scientific research.

Upon the replacement of the Social Credit Government of Harry Strom by the Conservative Government of Peter Lougheed in 1971, the Research Council, like other government agencies and departments, was subjected to scrutiny and appraisal of its functions. Unlike the HRRD, which was abolished under the new government, the council retained its existing framework and policy guidelines.

A significant transformation was effected in the technical structure of the Research Council in 1971 when the Fuels Branch was reorganized as the Physical Sciences Branch. The purpose of this administrative adjustment was to reflect the broad range of activities which were undertaken by the council. Within the Physical Sciences Branch, divisions were created to deal with chemical, biochemical and engineering aspects of resource utilization. Responsibility for the Gasoline and Oil Testing Laboratory was also vested in this branch.

Five principal areas of research were delineated by the council in the early 1970's; these broad groupings of projects are still pertinent to the present technical programs. As in the early 1960's, resource mapping and evaluation, and aid to industrial development, constituted two major activities of the council. Efforts were made to assist industrial enterprises in the expansion and diversification of their operations. As well, increased contract research services were provided and innovative experiments were conducted with the intention of enhancing the economic viability of secondary manufacturing and processing industries in the province.

A third key field of research concerned transportation; as during the 1960's, significant attention was focussed upon studies of pipeline transport and of highway design and performance. A fourth area of research comprised environmental studies related to resource development, manufacturing, municipal and recreation activities.



Efforts were devoted to the study and control of pollutants and to the evaluation of optimum land use in various regions throughout the province. The final cluster of projects centred upon the provision of technical aid to primary industries. Attempts to discover and improve mineral extraction techniques continued to constitute an important aspect of this area of research.

Within the major spheres of activity of the council, priorities were established on the basis of the assessment of the potential political, economic and social impacts of various projects upon the province. Thus, by 1972, prominent consideration was given to programs dealing with the development of the Athabasca oil sands; twelve projects pertaining to oil sands utilization were operative during that year. In subsequent years, the council has expanded its oil sands research program. Projects have been undertaken for companies, especially large international oil companies, in the private sector. In the government sector, most of the work has been carried out for the Alberta Department of Energy and Natural Resources, the Alberta Oil Sands Technology and Research Authority (AOSTRA) and the Alberta Oil Sands Environmental Research Program (AOSERP), a joint federal-provincial program. Current research programs of the Research Council touch, to varying extents, on almost all aspects of oil sands development - geological studies, production methods, bitumen upgrading and utilization, and environmental problems. A number of problems were incurred by the rapid expansion of energy related research. Problems regarding project cost control arose after 1972 as a result of the impact of steep inflation upon the costs of materials and services. Difficulties were also experienced in procuring experienced staff to undertake investigations in certain key areas of the oil sands programs. A serious problem was posed by the shortage of required laboratory and pilot plant space at a time when provincial economic conditions mitigated against the construction of new facilities. It was agreed by the council members that the best possible solution to problems involving space shortage was to limit the expansion of activities and expenditures, and to reallocate existing resources.

An informal internal appraisal of the administrative and technical

framework of the council, undertaken in 1975, culminated in a general consensus among council members that no more efficient structural organization could be perceived than that which currently governed council activities. The concept of subject-area advisory committees functioning under the auspices of a central Technical Advisory Committee was affirmed as an effective means to the conduct of increasingly diverse and comprehensive scientific and industrial research projects.

Growth in the magnitude and complexity of council operations has in recent years prompted renewed desires among council members, however, to evaluate the efficacy and relevance of present policies concerning research aims and priorities. As in earlier years, frequent consideration has been given to the maintenance of an effective balance between long and short range research. In the establishment and implementation of research policies, councillors of recent years have continued to stress the need, initially articulated by President Tory in the early 1920's, to maintain co-operative relationships with the political, academic and business elements of the community.

The entire question of the merits of national and provincial science policies has evoked increasing interest and speculation throughout Canada over the past decade; on several occasions, the Research Council has contributed views and proposals to discussions pertaining to various levels of government. Efforts were made at the time of the hearings of federal Special Committee of the Senate on Science Policy to persuade federal authorities of the significance of the aims and accomplishments of provincial research councils. Members of the council subsequently played a leading role in the establishment of the Non-Profit Industrial Research Association of Canada, an association designed to serve as a common voice for provincial councils in discussions of national science policy.

Present attempts to evaluate and clarify the role of the Research Council in the development of Alberta will undoubtedly find their way into the historical record as evidence of the concern of council members to uphold and enhance the standards of intellectual dedication and technical excellence towards which previous council members and researchers have striven.

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